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hit. It is interesting to note also that the final longitude differed only 9″.43 of an arc, or 410 feet, from that derived by moon culminations about twenty years before.

The work of tracing the boundary southward from the Yukon was begun in the spring of 1907 and was carried southward a distance of about one hundred and twenty miles. Aluminum-bronze monuments were erected on the north and south banks of the river, a trigonometric and topographic survey was made extending two miles on each side of the boundary for a distance of about forty-five miles, and a broad vista was cut through the woods for the same distance. The work planned for the coming season will carry the tracing of the line as far as the great mountains south of the White River, and the topographic survey and the monumenting will be pushed until the severity of the weather compels the surveyors to abandon the work and turn their faces homeward.

ORIENTATION OF MAPS.*

BY

F. P. GULLIVER.

OBJECTS OF PAPER.—From a study of the present conditions in elementary schools, the writer has come to the opinion that one of the fundamental difficulties in obtaining a clear idea of what a map represents lies in the fact that many of the maps first shown pupils have various orientations. He believes that if the north point on all maps were always placed at the top of the page much less difficulty would be experienced in teaching pupils to realize clearly that a map represents a certain definite portion of the surface of the earth.

If all maps followed the same rule in regard to their orientation there would be fewer adults who would say, as so many do to-day, "Oh, I cannot use a map, for it does not mean anything to me."

Children are taught their letters and are then taught to read words on the printed page. Children are also taught musical notes by ear and are then taught to read these musical notes from the printed music. In the same way children should be taught to see a certain portion of the surface of the earth, and then should be taught to read similar facts from printed maps. Books are printed with a definite orientation of letters and words; music is also printed with a definite relation to five lines of the staff; maps should likewise conform to the definite rule of position on the page. The child may then be taught that he would see the surface of the earth as it is represented upon a map, if he looked down upon it as a bird would do in flying through the air from the south to the north.

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* Read before the Association of American Geographers, January 1, 1907.

EARLY MAPS.—When the idea prevailed among men that the earth was flat, maps were drawn of the known portions upon sheets of the most convenient size to show what was desired. Some early maps were represented with the east at the top. An example of this is the Mappe-monde of Albi, the earliest mappe-monde now in existence. It illustrates the cosmography of Julius Honorius and of Orosius in a manuscript of the eighth century. It is a poorly made sketch with mistakes in relative geographic position of countries. (See Beazley, Dawn of Modern Geog. I, 1897, 385.)

The Leardo Map of 1452 has the east at the top of the map and the south at the right hand of the observer. (Bull. Am. Geog. Soc. XXXVIII, 1906, 366.) These maps were thus oriented because the inhabitants wished to put Jerusalem at the top of the page. The inhabitants of portions of Asia lying east of Jerusalem, if their ideas of the world were based on Jerusalem as the great historical centre of thought, made maps with the west at the top. Peoples living to the south with the same idea would have had the north at the top.

The Arab cartographers placed the south at the top of the page (Santarem, 1849, I, 421); and the Egyptians oriented their maps in the same way, as is proved by a map of the time of Seti I, described in Delegeur's "La cartographie chez les anciens."

There are some early maps of portions of North America with the west at the top. This arrangement probably resulted from the fact that the explorers travelled from the east to the west. They consequently represented what they saw as if they were moving from the east to the west over the land. An example is the sketch map, of Boston Harbor, in 1689, attributed to Captain Cyprian Southake. This map has the names of the islands in the harbor and most of the points of land surrounding the harbor, so that they may be read when holding the map with the west at the top. The title of the map and the large letters BOSTON HARBOUR are printed in the Fitzhugh copy, 1694, to read when holding the north at the top, while the three names Boston, Sentenall hill, and Charles Towne are printed so that the map must be held with the south at the top in order to read them easily.

MAGNETIC NORTH ORIENTATION.—Nordenskjöld (Periplus, 1897, 45-50) says that the use of the compass was known in China 2,000 years before the Christian Era, as there is a record of magnetic cars used at that time. The art was lost and was rediscovered in the third century A. D. In Europe the first record of the use of the compass was about 1200 A. D. Wind-roses placed on maps to show the points of the compass were seldom used before 1500 A. D. After this date, however, their use became common. The first map showing both true and magnetic north was made in 1530.

Where the variation of the compass is slight, magnetic north orientation gives a near approach to the true north orientation. In regions where the variation of the compass is great this method resulted in the production of maps with an approximate northwest or northeast orientaton.

As the fact became known that the compass did not point year after year to exactly the same point, there grew up the idea that some more fixed standard must be used for the orientation of maps.

TRUE NORTH ORIENTATION.—With the evolution of the idea that the earth was approximately a sphere rotating with a comparatively fixed axis pointing nearly to the north star, the present method of orientation of maps was developed, and we have on many old maps the double north point, showing both true and magnetic north.

There seems to have been formerly no uniformity in regard to the use of an arrow with two wings for true north and an arrow with one wing for magnetic north. This method is now generally used by map makers. Thus, on recent maps the true north is shown by an arrow-head with a black wing on each side, and the magnetic north is shown by an arrow with a black wing on one side only, this wing being placed on the side of the line corresponding to the variation of the needle. Thus, if the magnetic needle points to the west of the true north, the black wing will be on the left of the line; on the other hand, if the needle points to the east of the true north, the black wing will be on the right of the line.

DEEDS AND PLANS.—Many deeds and plans, even at the present time, are drawn with no reference to the meridian, or, at least, have the meridian put in apparently as an afterthought. There is a strong tendency among engineers in large cities at the present day to require all deeds and plans to have a true north orientation. This makes it very much easier to compare various deeds and plans. It would, therefore, be a great saving to the business interests of the world if all schools taught geography with maps which were universally oriented with the central meridian parallel to the right and left hand sides of the page.

MAP REPRESENTATION BY CHILDREN.—The writer has tried in a number of schools the experiment of asking children who have just begun the subject of geography, to draw a portion of the immediate surroundings of the school with which they are personally familiar. In some cases these children have been told where the north and south line lay with reference to the building. In other cases they have been told nothing about orientation. The results of these experiments have been exceedingly interesting, and the author has come to a tentative conclusion in regard to the ideas developed in the child just beginning the study of geography.

Children apparently have no fixed point of orientation which guides them in drawing a map of a known area. They are nearly as likely to put the east or the west at the top as the north. They very seldom place the south at the top. Even when they are told where the north and south line lies in the school room, they are generally unable to draw with correct orientation a map of a few streets which they know intimately. It is necessary to teach them by repeated trial and correction to orient themselves with reference to the mid-day line established by the shadow of a tree, a pole, or the edge of a building.

EDUCATIONAL VALUE OF ORIENTATION.—When children have been well taught to orient themselves with reference to the mid-day line of the school in which they are studying, they show a marked improvement in the percentage of correct orientations in drawing a new map. In all the experiments made by the writer these new maps have been of portions of the immediate neighbourhood of the school with which the children were familiar.

When young children are taught early in their study of geography to orient themselves in their immediate neighbourhood with a true north and south line, and when these children are shown no maps except those which are thus correctly oriented, the writer is of the opinion that the percentage of people who are able to use maps intelligently will be very largely increased.

In our modern life, with its strenuous activities, any method of education which tends to increased efficiency is of high value. A child trained in our modern schools must be able to read quickly the printed page; he must also be able to read and sing musical notes; likewise he should be able to read intelligently and quickly any map which is presented to him for use or study.

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GEOGRAPHICAL RECORD.

AFRICA.

African Forests.—Germany has adopted forestry regulations for her Togo colony. The Togo Government recently reported that a large part of the colony covered with forest a century ago has been denuded of its trees till these regions have taken on a steppe-like character, and evaporation has been so largely increased that the dry season reaches the proportions of a drought. Rules for the protection of the remaining forests have therefore been adopted. An area of 112 square miles is to be planted with trees every year and premiums have been offered to plantation companies and missionary societies to encourage the planting of some of the most useful trees:

> Mr. Walter Busse in a recent article on the destruction of timber in tropical Africa attributes the practice to the fact that the natives do not fertilize their tilled lands, but abandon them as soon as their productive capacity declines for new lands which they have meanwhile prepared for use. They kill trees on the edge of the forest by girdling them with gashes or stripping off the bark, cut down the dense undergrowth around them and in the dry season set fire to the brush, dead trees as well as the scrub being consumed. The ashes help to produce fine crops and another clearing is begun, in readiness to replace the new farm when it in turn begins to fail.
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> The deforestation of the country has been enormous wherever the population is dense. There is abundant evidence, Mr. Busse says, that a vast forest once extended from Sierra Leone to the Equator, most of which has been destroyed by man. One of the colonial Powers has now taken the first steps to change this course of things and to repair some of the damage done.